of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; C_5-C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy, and

wherein R^9 is absent or is selected from one or more of the group consisting of C_1-C_{12} alkylene or oxyalkylene; C_1-C_{12} alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; and C_5-C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; and

3) C_1-C_{10} cellulose ester having a DS equal to or less than about 2.5,

and wherein the article exhibits a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including the phenol-containing compound.

REMARKS

Claims 1 and 22 have been amended herewith to recite that the articles prepared from the claimed methods and compositions exhibit a delayed biodegradation rate over an article formed from a biodegradable polymer composition not containing the phenol-containing compound. Support for this amendment is found on page 5, lines 22-26. Claims 10-11, 14-15, 17-18 and 21 have been cancelled without prejudice. Claims 1-5, 7, 9, 22 and 24-28 are currently pending.

General comments about the anticipation rejections

As an initial matter, the Office Action has rejected the pending claims as allegedly anticipated by each of the references discussed in detail below. With regard to these rejections, Applicants respectfully state that for anticipation to exist, *each and every element* of the claims must be found, either expressly or inherently, in a single prior art reference. *See Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 U.S.P.Q.2d 1051, 1053 (Fed.

Cir. 1987). While the references cited against the present invention may, at some level, pertain to biodegradable polymer materials that can include a phenol-containing compound component, *none of the references cited in the Office Action are identical to the elements of the claims recited by Applicants.* As such, as a matter of law, none of the references cited in the Office Action can anticipate the claimed invention. *See Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1999). Accordingly, it is respectfully requested that the anticipation rejections be withdrawn as being improper.

Rejections in light of Blumenthal *et al.*

Claims 1-5, 7, 9-11, 14-15, 17-18, 21-22 and 24-28 have been rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Blumenthal (U.S. Patent No. 5,750,605). The rejection is as stated in the Office Actions dated November 30, 2001 and June 18, 2001. Additionally, the present Office Action alleges that "the use of the biodegradable polyester/terpene-phenol resin compositions in articles comprising containers and film is taught at col. 9, lines 30-60." (*See* Office Action at page 3.)

Blumenthal *et al.* disclose a hot melt adhesive composition comprising, *inter alia*, a sulfonated polyester and a phenol-terpene resin.

As discussed above, the anticipation rejections are not proper as a general matter because Blumenthal *et al.* do not expressly mention each and every element of the claimed invention. Further, as amended, each of the claims specifically recite that articles formed from the claimed compositions exhibit a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including-phenol-containing compounds. There is no mention of such a delayed biodegradation rate in Blumenthal *et al.* Accordingly, the claimed methods and compositions are not anticipated for this additional reason.

Moreover, Blumenthal *et al.* do not suggest or motivate in any manner that the degradation rate of the biodegradable polymers therein may be modified by the inclusion of a phenol terpene resin as is specifically recited in Applicants' invention. To the

contrary, Blumenthal *et al.* add tackifiers to assist in conferring the properties needed in a hot melt adhesive formulation. Blumenthal *et al.* specifically state that phenol-terpene resins, while generally not water dispersible, do not inhibit the water solubility of the sulfonated polymer used in the hot melt adhesives disclosed therein. (*See* Blumenthal *et al.* col. 6, lines 29-33.) Thus, Blumenthal *et al.* indicate that phenol-terpene resin does not lessen or retard the biodegradable properties of the sulfonated polymers therein. Put another way, the presence of phenol-terpene resin the sulfonated polymers of Blumenthal *does not slow the biodegradability of those polymers.* Significantly, Applicants include the phenol-terpene resin in their compositions for the exact opposite effect, that is, to slow the degradation of the biodegradable polymers claimed. Accordingly, Blumenthal *et al.* teach away from the Applicants' claimed methods and compositions. As such, Blumenthal *et al.* does not render the present invention obvious.

Rejection in Light of each of Schoenberg *et al.*, Rutherford *et al.*, Iovine *et al.* and Kaufmann *et al.*

Claims 1-5, 9-11, 14-15, 17-18, 21-22 and 25-28 have been rejected under 35 U.S.C. §102(b) as allegedly anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over each of Schoenberg *et al.*, Rutherford *et al.*, Iovine *et al.* and Kaufman *et al.*[1] The rejection is stated to be as discussed in the Office Actions dated November 30, 2001 and June 18, 2002. Further, it is alleged that the "use of the biodegradable polyester/terpene–phenol resin compositions in articles comprising containers and/or film is taught at col. 7, lines 37-53 (Schoenberg), col. 9, lines 29-49 (Rutherford), col. 5, lines 1-26 (Iovine) and col. 4, lines 44-65 (Kaufman)." (*See* Office Action at page 3.) Therefore, it is concluded that the "use of biodegradable polyester/terpene-phenol resin compositions in a method comprising forming the compositions into an article comprising film or container is anticipated or would have been obvious over the teaching of each of the references." *Id.*

[1] Since the Office Action states that the rejections are over each of the specified references, Applicants understand that the references are being applied individually against the claims. Nonetheless, Applicants respectfully contend that the references cannot be combined to render the claimed invention obvious because there is no suggestion or motivation in any of the references that such a combination can be accomplished.

Schoenberg *et al.* (U.S. Patent No. 5,952,405)

Schoenberg *et al.* disclose hot melt adhesives comprising, *inter alia*, polylactide or polyglycolide graft copolymer and, optionally, a tackifying resin, where the tackifying resin can comprise terpene phenolics and other phenolic materials.

Since the specific biodegradable polymers recited by Applicants are not disclosed either expressly or inherently in Schoenberg *et al.*, this reference does not anticipate the claimed invention. Moreover, there is no express or inherent disclosure that articles may be prepared from the compositions of Schoenberg *et al.* where such articles would exhibit a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including phenol-containing compounds. As such, Schoenberg *et al.* does not anticipate the claimed compositions and methods for this additional reason.

Further, Schoenberg *et al.* do not suggest or motivate the compositions and methods claimed by Applicants. Also, there is no mention whatsoever of biodegradation in Schoenberg *et al.*, let alone a delayed biodegradation rate. Therefore, Schoenberg *et al.* does not render the present invention obvious for at least these reasons.

Rutherford *et al.* (U.S. Patent No. 5,753,364)

Rutherford *et al.* disclose tacky pressure-sensitive adhesives ("PSA's") made from poly (hydroxyorganoates). The PSA's can include phenol-containing resins, such as terpene phenolics and pure phenolic resins.

Rutherford *et al.* do not anticipate the claimed compositions and methods because there is no express or inherent disclosure of the specific compositions claimed by Applicants, nor is there any disclosure that the biodegradability of the PSA's would be affected in any manner by the inclusion of phenol-containing resins in the compositions therein.

Moreover, Rutherford *et al.* do not suggest or motivate the compositions and methods of the present invention. While Rutherford *et al.* do mention that the PSA's therein are biodegradable, there is no mention that the inclusion of terpene-phenol materials would delay the biodegradation rate of articles prepared from the compositions therein. Therefore, Rutherford *et al.* do not render the claimed compositions and methods obvious.

Iovine *et al.* U.S. Patent No. 5,252,646)

Iovine *et al.* disclose hot melt adhesive compositions prepared from, *inter alia,* 20 to 98 % by weight of a polylactide homo- or copolymer containing at least 20 molar percent of the lactide component and from 2 to 80 % by weight of a polar tackifier. The polar tackifier can comprise terpene phenolics and phenolic resins.

Iovine *et al.* do not anticipate the present invention because there is no express or inherent disclosure of the specific compositions claimed by Applicants, nor is there any disclosure that the biodegradability of the hot melt adhesives therein would be affected in any manner by the inclusion of phenol-containing resins in the compositions therein.

Moreover, Iovine *et al.* do not suggest or motivate the methods of the present invention. There is no suggestion or motivation of the specific biodegradable polymers recited by Applicants. While Iovine *et al.* do mention that the hot melt adhesives therein are biodegradable, there is no mention that the inclusion of terpene-phenol materials would delay the biodegradation rate of articles prepared from the compositions therein. Therefore, Iovine *et al.* do not render the present invention obvious.

Kauffman *et al.* (U.S. Patent No. 5,169,889)

Kauffman *et al.* disclose hot melt adhesive compositions prepared from, *inter alia*, 20 to 90 % by weight of a linear polyester of 3-hydroxybutyric acid and from 10 to 80 % of a polar tackifier. The polar tackifier can be a phenolic-containing compound.

Kauffman *et al.* do not anticipate the present invention because there is no express or inherent disclosure of the specific compositions claimed by Applicants, nor is there any disclosure that the biodegradability of the hot melt adhesives therein would be affected in any manner by the inclusion of phenol-containing resins in the compositions therein.

Moreover, Kauffman *et al.* do not suggest or motivate the methods and compositions of the present invention. Kauffman *et al.* do not suggest or motivate the specific biodegrable polymers recited by Applicants. Further, while Kauffman *et al.* do mention that the hot melt adhesives therein are biodegradable, there is no mention that the inclusion of terpene-phenol materials would delay the biodegradation rate of articles

prepared from the compositions therein. Therefore, Kauffman *et al.* do not render the present invention obvious.

Rejections over Japanese '903

Claims 1-5, 9-11, 14-15, 17-18 and 21-22 have been rejected under 35. U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Japanese Patent Publication Number 2000-007903 ("Japanese '903").

As an initial matter, Japanese '903 is a publication, not a U.S. patent. Therefore, it cannot be prior art under 35 U.S.C. § 102(e). To the extent that this publication might constitute prior art against the claimed invention, this publication can only constitute prior art under § 102(a). Accordingly, Applicants will treat the rejection as such.

Japanese '903 discloses polylactic acid compositions comprising phenol-terpene materials. Articles prepared from such compositions are also disclosed. Although the translation provided with the Office Action is not particularly clear, it appears that the phenol compound is included in the polylactic acid composition to increase the Tg of the compositions.

Again, this reference does not anticipate the claimed invention because each and every element of Applicants' claims are not disclosed, whether actually or inherently, therein. In particular, there is no mention of the specific polymer types claimed by Applicants, nor is there any disclosure that articles prepared from the recited polymer compositions would have a delayed biodegradation rate.

Moreover, there is no statement in the Office Action of any suggestion or motivation that the articles of Japanese '903 that would render the claimed invention obvious. The absence of the required basis for the obviousness rejection stated in the Office Action results in the obviousness rejection over Japanese '903 being improper. As such, Applicants respectfully request that the rejection be withdrawn.

Further, even though the obviousness rejection is improper, there is no suggestion or motivation of the specific biodegradable polymers recited by Applicants. Moreover, there is, in fact, no suggestion or motivation in Japanese '903 relating to a difference in degradation rates. To the contrary, this reference appears to be directed toward the

elevation of Tg in polylactic acid polymers to result in a higher melting point for articles prepared from such compositions. That is, it appears that the articles in Japanese '903 will melt at a higher temperature than articles made from polylactic acid not having phenol-terpene. Even though the Tg of such polymers may be greater with the addition of phenol-terpene, such a Tg is wholly unrelated to the degradation rate of the articles. Specifically, as would be readily recognized by one of ordinary skill in the art, a polymer may melt at a particular temperature, but it will not biodegrade at any temperature unless it is a biodegradable polymer. Thus, Japanese '903 does not suggest or motivate a difference in biodegradation rates with the addition of phenol-terpene resins. Accordingly, Japanese '903 cannot render the present invention obvious.

Rejection under Hashitani et al.

The Office Action rejects claims 10-11, 14-15, 17-18 and 21 under 35 U.S.C. § 103(a) as obvious over Hashitani *et al.* It is alleged that this reference teaches the use of phenol compounds to slow the degradation of biodegradable polyesters used to form injection molded articles.

Hashitani *et al.* disclose articles made from biodegradable polymers where the articles have an antibiotic included therein to slow degradation.

Again, there is no disclosure in Hashitani *et al.* of the specific biodegradable polymers claimed by Applicants. Moreover, claims 1 and 21 of the instant application recite a phenol-terpene compound. Hashitani *et al.* do not disclose phenol-terpene resin and, as such, claims 1 and 22 is not anticipated for this additional reason.

There is no suggestion or motivation of the specific polymers recited in the present invention. Further, there is no suggestion or motivation that phenol-terpene resins or phenol-containing compounds may be incorporated into the biodegradable polymers to result in a delayed degradation rate. Rather, Hashitani *et al.* disclose antibiotic materials that are mixed with a biodegradable polymer. Phenol-terpene resins are tackifiers that are used in adhesive compositions, such materials have no relation to any of the antibiotic materials disclosed in Hashitani *et al.* Indeed, phenol-terpene resins are not antibiotics. As such, one of ordinary skill in the art would not find from Hashitani

et al. a suggestion or motivation that phenol-terpene resins may be used to delay the degradation of articles as claimed in the present application. Therefore, Hashitani *et al.* do not render the present invention obvious.

CONCLUSION

In light of the above Amendment and Remarks, Applicants respectfully request that the rejections be withdrawn.

No fee is believed due; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,
NEEDLE & ROSENBERG, P.C.

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CERTIFICATE OF MAILING

I hereby certify that this AMENDMENT is being sent via U.S. mail addressed to Box Non-Fee Amendment, Commissioner for Patents, Washington, D.C. 20231, on the date shown below.

Jacqueline M. Hutter — Date: 2/21/03

MARKED-UP VERSION OF AMENDMENTS

Please delete claims 10-11, 14-15, 17-18 and 21 without prejudice.

Please amend claims 1 and 22 as follows:

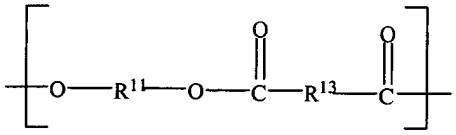
1. A method for preparing an article from a biodegradable polymer composition wherein the method comprises:

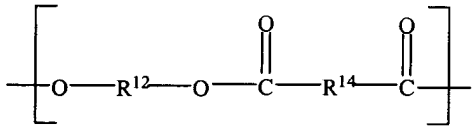
a. introducing a phenol-containing compound comprising terpene-phenol resin into a biodegradable polymer or biodegradable polymer composition in an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer composition; and

b. mixing the phenol-containing compound with the biodegradable polymer or biodegradable polymer composition;

wherein the biodegradable polymer or biodegradable polymer composition comprises one or more of:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:



and


wherein

(i) R^{11} and R^{12} are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimathanol, 1,4-

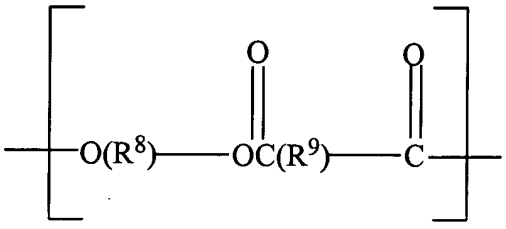
cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;

(ii) R^{11} and R^{12} are 100% of the diol components in the copolyester;

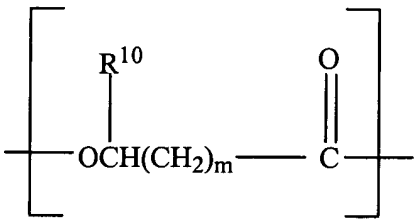
(iii) R^{13} is absent or is selected from one or more of the groups consisting of C_1 - C_{12} alkylene or oxyalkylene; C_1 - C_{12} alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6 - C_{10} aryl, and C_1 - C_4 alkoxy; C_5 - C_{10} cycloalkylene; and C_5 - C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6 - C_{10} aryl, and C_1 - C_4 alkoxy; and

(iv) R^{14} is selected from one or more of the groups consisting of C_6 - C_{10} aryl, and C_6 - C_{10} aryl substituted with one to four substituents independently selected from the group consisting of halo, C_1 - C_4 alkyl, and C_1 - C_4 alkoxy;

2. an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and R^{10} is selected from the group consisting of hydrogen; C_1-C_{12} alkyl; C_1-C_{12} alkyl substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkyl; and C_5-C_{10} cycloalkyl substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy,

wherein R^8 is selected from the group consisting of C_2-C_{12} alkylene or C_2-C_{12} oxyalkylene; C_2-C_{12} alkylene or C_2-C_{12} oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; C_5-C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy, and

wherein R^9 is absent or is selected from one or more of the group consisting of C_1-C_{12} alkylene or oxyalkylene; C_1-C_{12} alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; and C_5-C_{10} cycloalkylene substituted with one to

four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; and

4) a C_1-C_{10} cellulose ester having a DS equal to or less than about 2.5; and

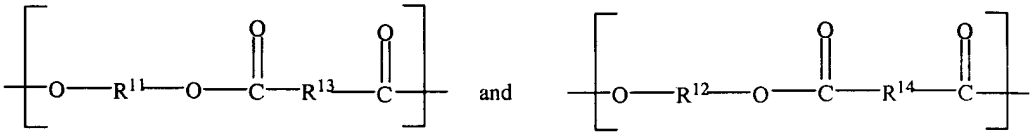
c. forming the biodegradable polymer composition into an article, wherein the article comprises: a film, a bottle, a blow molded article, an injection molded article or a container, and wherein the article exhibits a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including the phenol-containing compound.

22. (Three times amended) A biodegradable polymer composition for making an article comprising a film, a bottle, a blow molded article, an injection molded article or a container, wherein the biodegradable polymer or biodegradable polymer-second material composition comprises:

a. a phenol-containing compound comprising terpene-phenol resin incorporated in the biodegradable polymer or biodegradable polymer-second material composition, the phenol-containing compound being present at an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer second-material composition; and

b. a biodegradable polymer or biodegradable polymer-second material composition comprising one or more of the following:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:



wherein

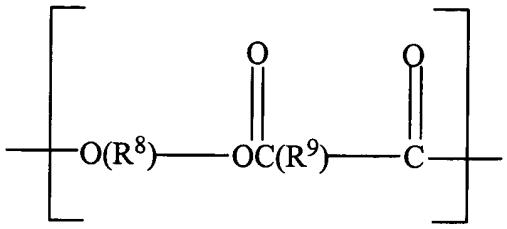
(i) R^{11} and R^{12} are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimathanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;

(ii) R^{11} and R^{12} are 100% of the diol components in the copolyester;

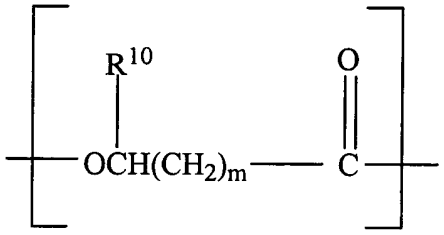
(iii) R^{13} is absent or is selected from one or more of the groups consisting of C_1 - C_{12} alkylene or oxyalkylene; C_1 - C_{12} alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6 - C_{10} aryl, and C_1 - C_4 alkoxy; C_5 - C_{10} cycloalkylene; and C_5 - C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6 - C_{10} aryl, and C_1 - C_4 alkoxy; and

(iv) R^{14} is selected from one or more of the groups consisting of C_6 - C_{10} aryl, and C_6 - C_{10} aryl substituted with one to four substituents independently selected from the group consisting of halo, C_1 - C_4 alkyl, and C_1 - C_4 alkoxy;

2) an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and R^{10} is selected from the group consisting of hydrogen; C_1-C_{12} alkyl; C_1-C_{12} alkyl substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkyl; and C_5-C_{10} cycloalkyl substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy,

wherein R^8 is selected from the group consisting of C_2-C_{12} alkylene or C_2-C_{12} oxyalkylene; C_2-C_{12} alkylene or C_2-C_{12} oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; C_5-C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy, and

wherein R^9 is absent or is selected from one or more of the group consisting of C_1-C_{12} alkylene or oxyalkylene; C_1-C_{12} alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; C_5-C_{10} cycloalkylene; and C_5-C_{10} cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, C_6-C_{10} aryl, and C_1-C_4 alkoxy; and

3) C_1-C_{10} cellulose ester having a DS equal to or less than about 2.5,

and wherein the article exhibits a delayed biodegradation rate over an article formed from a biodegradable polymer composition not including the phenol-containing compound.